

## SHORT NOTE

# MIS for Contract Management in Large Research Programme

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## ABSTRACT

Contract management is an important task in any R&D establishment. Keeping track of various **events linked** with a contract would help management **decision** making. This paper briefly describes the application of a management information system for **contract** management, the features of the system and the various output reports which can be generated for usage by the management.

## 1. INTRODUCTION

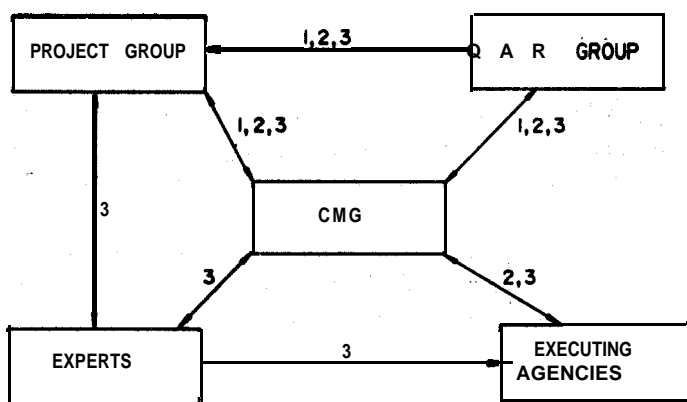
A major proportion of country's R&D output is generated from the government supported research laboratories **specialising** in the areas of industrial, **defence**, space and nuclear research activities. During a period of nearly four decades, a vast network of R&D institutions has been **developed** in the country with challenging capabilities for the acquisition, absorption, development and generation of existing/new technologies. In most large R&D organisations a number of long duration and capital intensive R&D programmes are undertaken to achieve the various objectives as enunciated in the country's Technology Policy Statement (TPS), S&T, Space and Defence Research **Policies**. With **considerable** increase in R&D expenditure, it is now **not uncommon** to find **criticism** in regard to **R&D spending and delay** in the completion of research programmes which are of national and strategic importance. It has become almost essential to monitor the time factor in these programmes involving more than one project.

## 2. NECESSITY OF CONTRACTS

Each project in these programmes consists of a number of activities involving the work of design, development, fabrication, installation and commissioning of various hardware, software items to take up various R&D activities. If all these activities are to be undertaken by the institution responsible for the research programme, then it is most likely that they may not have the necessary expertise and infrastructure for some of these activities. However the same may exist in other government establishments, 'educational institutions, private and public enterprises and they may be freely available to take up these tasks of national importance and thus save valuable time. In order to use these facilities and save time and money, contracts are placed with these agencies for specific tasks by the concerned project group in the institution responsible for the programme. These contracts lay down the exact specifications of the job, time schedules and terms of payments; Also a committee is formed to monitor and review the progress of these contracts and' take corrective actions. These committees invariably consist of representatives from the project, executing agency, quality assurance and reliability (QAR) group and outside experts in the field.

## 3. CONTRACT MANAGEMENT

The process starts with project group placing the demand with contract management group (CMG) with necessary specifications and sanctions in consultation with QAR group. They also specify target dates for in between process details such as quotations, negotiations and finalisation of contracts, etc. in consultation with CMG. Then CMG has to follow up various stages from raising enquiries for quotations to finalise the contract. These stages are so many in each contract that without the



- 1 Placement of demand
- 2 Finalisation into contract
- 3 Execution of contract

**Figure 1.** Agencies involved in the process of contract management.  
**Key :** 1. Placement of demand; 2. Finalisation; and 3. Execution.

use of the computer in monitoring, it is difficult to know the hold ups for taking corrective actions. The agencies involved in this stage of demand to contract are project group, CMG, QAR and probable executing agencies as shown in Fig. 1. After the contract is signed, the execution of contracts is monitored by all concerned including experts in the field forming the progress review committee (PRC). In a large research programme, the demand for these contracts grow in number and it is required to cut the time between the demand and actual placement of contract and also during execution of the contract. As the number of contracts is likely to be large, agencies concerned are many and heavy amount of money is involved, it is essential that a proper Management Information System (MIS) is evolved to meet the requirements of all levels of management to monitor the progress effectively.

#### 4. DESIGN OF MIS

An MIS is designed for contract management in a large research programme using DMIV database software on in-house DPSJ Computer System. DMIV is the database software based on CODASYL recommendations following network data model available on Honeywell's DPS-8 mainframe computers. This software supports very large databases. Its capacity is of 68 billion records with each record size of 16k bytes. The logical design of database which is based on network data model is given in Fig. 2.

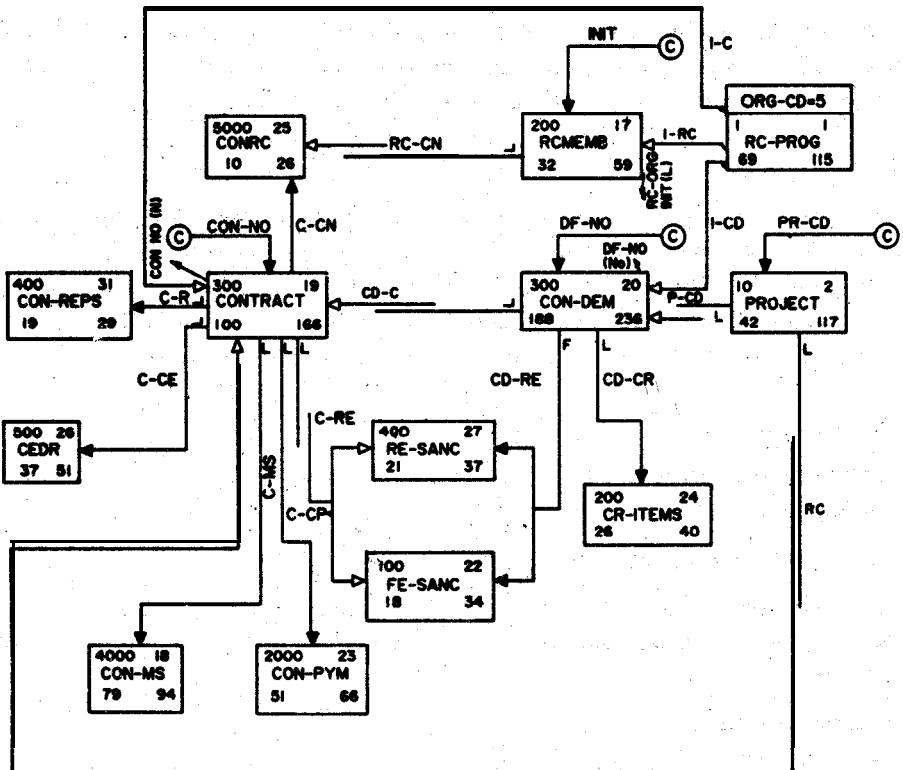


Figure 2. Schema diagram for contract management.

The **RES-PROG** is a direct record containing the name of the programme director and institution. The **PROJECT** is a record containing project details of project name, project director and its start and finish dates. There can be more than one project in the entire research programme. The **CON-DEM** record contains details of demand with target and actual dates of various steps in the progress of a demand such as tender purchase committee formation, tender purchase approval dates leading finally to a contract. This record is connected to RES-PROG record through a sorted I-CD set on demand number (DF-NO) and to PROJECT record manually through P-CD set. This does not allow duplicate demand records to be stored and also gives them in a sorted order. CR-ITEMS is an optional record connected to CON-DEM through a via set CD-CR having information of critical items mentioned at the time of demand which are to be made available before the contract can become operational. RE-SANC and FE-SANC are **records** for sanction details of rupee and foreign exchange elements. Any revision is stored as another record. CONTRACT record having information about the contract is entered when contract is materialised and connected to CON-DEM and corresponding RE-SANC and FE-SANC records. Each contract record may have **CON-REPS** records for the names of representatives associated with it, CON-PYM records having details of payments and its terms, **CEDR** records having details of events which are required to be fulfilled between signing the contract and its becoming effective, for example, initial payment, etc. Each contract has its PERT in the form of bar charts and milestones. These milestones are also stored on **CON-MS** records. Review committee members are stored once only in **RCMEMB** record and connected to the CONTRACT record they are related to through a link record CONRC. The details regarding all of record types, location mode, maximum number of occurrences expected, physical and logical sizes are indicated in Fig. 2.

#### 4.1 Input

Input to the system is through forms which are filled only **once initially** when a demand is received (form number PMSTA 21) and contract is **finalised** (form numbers PMSTA 22 and PMSTA 23). The information is updated directly through user-friendly interactive programmes and is **obtained on** the output reports. **Initial data** loading is also done through interactive programmes as soon as the demand/contract is finalised.

#### 4.2 Output

The system gives following reports for monitoring demands and contracts for various aspects.

##### 4.2.1 Status of Contract Demands in Progress

This will give a list of demands pending with various target and actual dates of various steps in finalising a contract. **These** reports are meant for lower and middle management.

##### 4.2.2 Status of Contracts in Progress

These reports give **various contracts** which are signed but not effective with related events mentioned for proper action, **and are** meant for lower and middle management.

#### 4.2.3 Payments Due Between the Given Dates

This report helps in knowing the payments due and related events prior to make the payment for timely actions by-concerned persons and is primarily used by lower and middle management.

#### 4.2.4 Status of Contract Milestones in Progress

This report lists the milestones starting from a given **date and** not completed with **list** of PRC members so that it can be updated by them during PRC meeting- and given to CMG. This report is primarily used by the lower and middle management.

#### 4.2.5 List of PRC Members

This report gives a **list** of PRC members and contracts they are related to and-is primarily used' by middle and senior management.

#### 4.2.6 Status of Demands in Progress

This gives the status of demands in brief for senior management.

#### 4.2.7 Type of Agency- Wise Contracts

**This** gives us a list of ongoing contracts for each type of agency **and within** it'for different agencies and is meant for middle and senior management.

#### 4.2.8 PRC Members and Their Related Contracts

This report is to print each PRC member and **contracts he/she** is concerned and to ask the progress in the form of a note which he/she is required to fill and return. This avoids extra typing at both ends and some stationery and, is meant for middle management.

### 5. QUERY FOR SENIOR MANAGERS

A query interface is provided using QRP software for senior managers. The interface is provided, through an application definition file (**ADF**) which contains entries through which QRP retrieves from the database. QRP software also include DESCRIBE and DIALOG sub-systems besides the QRP procedures and 'QUERY. DESCRIBE is used for describing the ADF file, i.e., to know the various entries and their details. DIALOG is to generate the QRP procedures through an interactive dialog and run the query. QRP procedures which are very simple can also be directly built by the users. QUERY language can also be used to answer simple queries. The language and procedures are so simple that with very little effort by any senior manager can get his queries answered on a terminal in his room. Facility exists for displaying output on terminal or taking in printed forms. **Some** of the sample queries tried are : (a) Print given fields for a contract whose PRC lies **between** the given dates; (b) Print given fields for a contract having total price greater than a given amount and also give the sum of these prices; (c) List of contracts with private/public/government/institutional sectors with other additional criteria desired; and (d) List of contracts in a particular financial year (or between the given dates) having contract value greater than a given amount.

Many similar adhoc queries for R&D headquarters can be answered by managers having a terminal in their room and with minimum knowledge of the QUERY language.

## **6.CONCLUSION**

This system helps different managers to properly monitor the demands and contracts and answer ad hoc queries of senior managers. It helps in knowing the pending actions, forthcoming events provided it is updated regularly.

## **ACKNOWLEDGEMENTS**

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